

8.5 B - The student is expected to identify that protons determine an element's identity & valence electrons determine its chemical properties, including reactivity.

APE

Atomic # = proton # = electron # (only in a neutral atom)

always the same

used to ID an element

13 p⁺ Al

83 p⁺ Bi

79 p⁺ Au

Neutrons cannot be used to ID an element

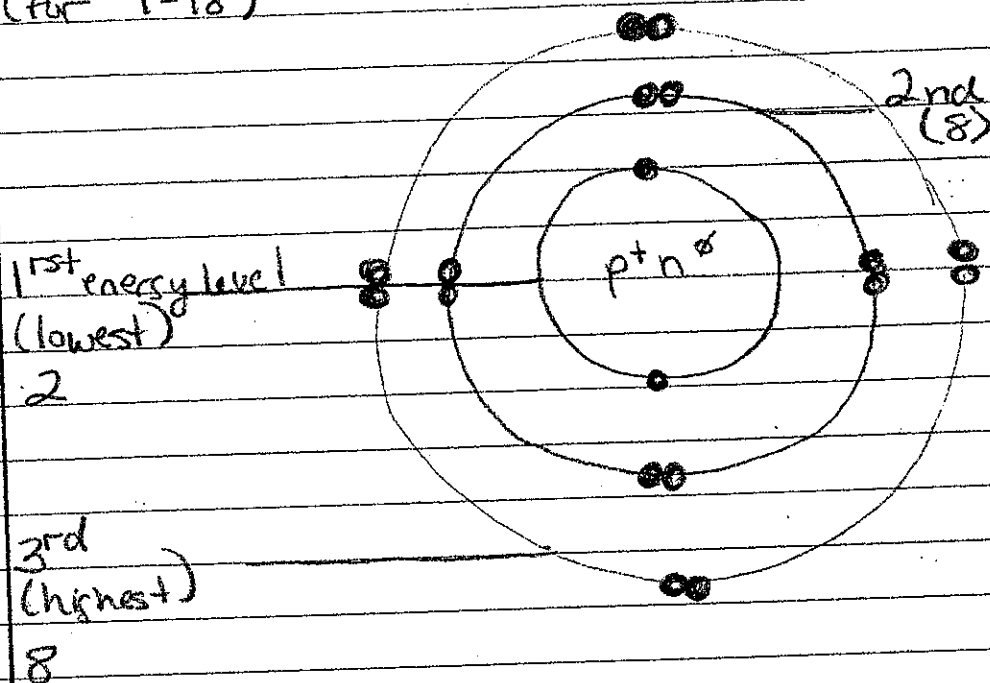
B 6 n⁰

C 6 n⁰

Electrons cannot be used to ID an element

Electrons :

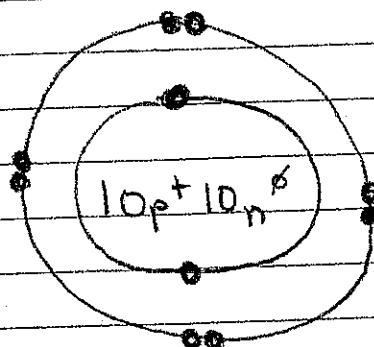
Bohr model -
(for 1-18)



Atoms want a full outer/valence shell (2 or 8)
They are stable & will not react @ full outer shell.
Octet Rule

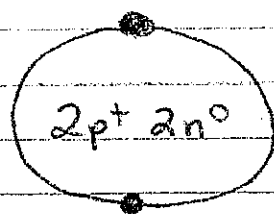
eg - Ne $10p^+$, $10e^-$, $10n^0$

Neon is stable/
not reactive



He $2p^+$, $2e^-$, $2n^+$

He is stable / not reactive



* All of group 8A has full valence shell / not reactive
Noble gases

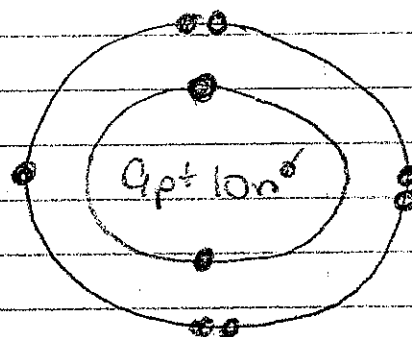
F $9p^+$ $9e^-$ $10n^+$

What will make Fluorine happy?

Gain $1e^-$

$9p^+$ $10e^-$

- charged ion F^-



O $8p^+$ $8e^-$ $8n^+$

What will make O happy?

Gain $2e^-$

$8p^+$ $10e^-$

- charged ion O^{2-}



Which is more reactive? (Which reacts most easily?)
F only needs 1 electron to be happy, so it reacts more easily

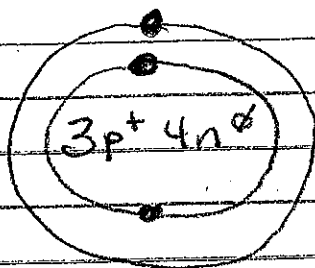
Li $3p^+ 3e^- 4n^\times$

Wants to lose

$1e^-$

$3p^+ 2e^-$

+ ion Li^+



Be

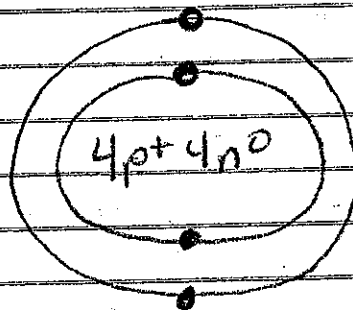
$4p^+ 4e^- 5n^\times$

Wants to lose $2e^-$

$4p^+ 2e^-$

+ ion

Be^{+2}



Left side likes to lose electrons + become
+ ions (metals)

Right side likes to gain electrons + become
- ions (nonmetals)